WE CLAIM:

1. A method for testing for the presence of a coating, comprising a step of:

testing for the presence of a sol-gel coating on a metal surface.

2. The method of claim 1 wherein said testing step includes testing for the presence of sol-gel coated on aluminum.

3. The method of claim 1, further comprising a step of:
placing a test specimen of unknown coating in a solution.

4. The method of claim 1, further comprising a step of:
observing a length of time for a test specimen of unknown coating to change color.

5. The method of claim 1, further comprising steps of:
placing a test specimen of unknown coating in a solution; and
observing a length of time for said solution to become opaque.

6. The method of claim 1, further comprising a step of:
observing a length of time for a control specimen to change color.

7. The method of claim 1, further comprising steps of:
placing a control specimen in a solution; and
observing a length of time for said solution to become opaque.

8. The method of claim 1, further comprising steps of:

placing a test specimen of unknown coating in a solution in a first receptacle;

placing a control specimen in said solution in a second receptacle;

observing a first length of time for the test specimen to change color;

observing a second length of time for the control specimen to change color; and

determining a presence or absence of the coating on the test specimen based on comparison of said first length of time and said second length of time.

9. The method of claim 8, wherein said observing steps include:

observing a first length of time for the test specimen to change color or not;

observing a second length of time for the control specimen to change color or not;

10. The method of claim 1, further comprising steps of:

placing a test specimen of unknown coating in a solution in a first receptacle;

placing a control specimen in said solution in a second receptacle;

observing a first length of time for said solution in said first receptacle to become opaque;

observing a second length of time for said solution in said second receptacle to become opaque; and

determining a presence or absence of the coating on the test specimen based on comparison of said first length of time and said second length of time.

11. The method of claim 1, further comprising steps of:

placing a test specimen of unknown coating in a solution in a first receptacle;

placing a conversion-coated control specimen in said solution in a second receptacle;

placing a sol-gel-coated control specimen in said solution in a third receptacle;

observing a first length of time for the test specimen to change color;

observing a second length of time for the conversion -coated control specimen to change color;

observing a third length of time for the sol-gel-coated control specimen to change color; and

determining a presence or absence of the coating on the test specimen based on comparison of said first length of time, said second length of time, and said third length of time.

12. The method of claim 11, wherein:

said conversion-coated control specimen has a leached alodine coating; and

said sol-gel-coated control specimen has a leached alodine plus sol-gel coating.

13. A method for testing for the presence of a coating, comprising steps of:

placing a mixed solution in a receptacle;

placing a test specimen of unknown coating in said receptacle; and

timing an event to make a determination of whether or not the coating is present.

14. The method of claim 13 wherein said timing step comprises making a determination of whether or not a sol-gel coating is present.

15. The method of claim 13 wherein said event is a change in color of the test specimen to blue.

16. The method of claim 13 wherein said event is no change in color of the test specimen after a pre-determined amount of time.

17. The method of claim 13 wherein said event is said mixed solution becoming opaque.

18. The method of claim 13 further comprising steps of:

placing a sol-gel-coated control specimen in said mixed solution in a second receptacle;

timing a second event; and

determining that sol-gel is present on the test specimen of unknown coating if the timing of the event and the timing of the second event are comparable.

19. The method of claim 13 further comprising steps of:

placing a sol-gel-coated control specimen in said mixed solution in a second receptacle;

placing an conversion -coated control specimen in said mixed solution in a third receptacle;

timing a second event;

timing a third event;

determining that sol-gel is present on the test specimen of unknown coating if the timing of the event and the timing of the second event

are comparable; and

determining that sol-gel is not present on the test specimen of unknown coating if the timing of the event and the timing of the third event are comparable.

20. The method of claim 13 further comprising a step of:

forming said mixed solution from an indicating solution and an etching solution.

21. The method of claim 13 wherein said step of placing a mixed solution in a receptacle comprises:

placing a indicating solution in said receptacle; and

mixing an etching solution with said indicating solution in said receptacle.

22. The method of claim 13 further comprising a step of:

preparing an indicating solution from water and an ingredient chosen from the group consisting of: ammonium molybdate, sodium molybdate, and potassium molybdate.

23. The method of claim 13 further comprising a step of:

preparing an indicating solution from water and an ingredient chosen from the group consisting of the alkali metal molybdates.

24. The method of claim 13 further comprising a step of:

preparing an indicating solution from water and an ingredient chosen from the group consisting of the alkaline earth metal molybdates.

25. The method of claim 13 further comprising a step of:

preparing an etching solution from water and an ingredient chosen

from the group consisting of: hydrochloric acid, and hydrobromic acid.

26. The method of claim 13 further comprising a step of:

preparing an etching/indicating solution including nitric acid.

27. A method for testing for the presence of a coating on aluminum, comprising steps of:

mixing an indicating solution and an etching solution in a plurality of receptacles to form a mixed solution in said plurality of receptacles;

placing a test specimen of unknown coating in a first receptacle of said receptacles;

placing a control specimen in a second receptacle of said receptacles; and

timing a plurality of events to make a determination of whether or not the coating is present on the test specimen.

28. The method of claim 27 wherein the coating tested for is a sol-gel coating.

29. The method of claim 27 wherein said plurality of events includes:

a change in color of the entire test specimen to dark blue; and

a change in color of the entire control specimen to dark blue.

30. The method of claim 27 wherein said plurality of events includes:

said mixed solution in said first receptacle becoming opaque to room light; and

said mixed solution in said second receptacle becoming opaque to room light.

31. The method of claim 27 wherein said test specimen and said control specimen are aluminum parts of the same size, type and alloy.

32. The method of claim 29 further comprising steps of:

placing a second control specimen in a third receptacle of said receptacles; wherein said plurality of events includes a change in color of the entire second control specimen to dark blue;

determining that the test specimen of unknown coating has a like coating to that of the control specimen if the timing of the change in color of the entire test specimen to dark blue and the timing of the change in color of the entire control specimen to dark blue are comparable; and

determining that the test specimen of unknown coating has a like coating to that of the second control specimen if the timing of the change in color of the entire test specimen to dark blue and the timing of the change in color of the entire second control specimen to dark blue are comparable.

33. The method of claim 30 further comprising steps of:

placing a second control specimen in a third receptacle of said receptacles; wherein said plurality of events includes said mixed solution in said third receptacle becoming opaque to room light; and

determining that the test specimen of unknown coating has a like coating to that of the control specimen if the timing of said mixed solution in said first receptacle becoming opaque to room light and the timing of said mixed solution in said second receptacle becoming opaque to room light are comparable; and

determining that the test specimen of unknown coating has a like coating to that of the second control specimen if the timing of said mixed solution in said first receptacle becoming opaque to room light and the timing of said mixed solution in said third receptacle becoming opaque to room light are comparable.

34. The method of claim 27 further comprising steps of:

placing a second control specimen in a third receptacle of said receptacles; wherein:

said test specimen, said control specimen, and said second control specimen are aluminum rivets of the same size, type and alloy;

said control specimen has a sol-gel over conversion coating;

said second control specimen has only a conversion coating; and

said timing step includes determining whether said test rivet has the sol-gel over conversion coating or only the conversion coating.

35. The method of claim 27 further comprising a step of:

preparing said indicating solution by adding 10 g of ammonium molybdate, 4-hydrate in 100 ml of water.

36. The method of claim 27 further comprising a step of:

preparing said etching solution by adding concentrated hydrochloric acid.(HCl) in 1:1 ratio to water.

37. A method for testing for the presence of sol-gel on an aluminum test specimen, comprising steps of:

preparing fresh, weekly, an indicating solution by dissolving 10 g of ammonium molybdate, 4-hydrate in 100 ml of water;

preparing an etching solution by adding hydrochloric acid in 1:1 ratio to water;

using a pipette to place 4 ml of said indicating solution into each of a plurality of receptacles;

adding 2 ml of said etching solution to each of said plurality of receptacles;

mixing said indicating solution and said etching solution in each of said plurality of receptacles to form a mixed solution in each of said plurality of receptacles;

placing a test specimen of unknown coating in said mixed solution in a first receptacle of said plurality of receptacles;

placing a first control specimen in said mixed solution in a second receptacle of said plurality of receptacles;

placing a second control specimen in said mixed solution in a third receptacle of said plurality of receptacles; wherein:

said test specimen, said control specimen, and said second control specimen are aluminum rivets of the same size, type and alloy;

said first control specimen has a sol-gel over conversion coating;

said second control specimen has only a conversion coating;

timing a plurality of events including:

a change in color of the entire test specimen to dark blue;

a change in color of the entire first control specimen to dark blue; and

a change in color of the entire second control specimen to

dark blue;

determining that the test specimen of unknown coating has a like coating to that of the first control specimen if the timing of the change in color of the entire test specimen to dark blue and the timing of the change in color of the entire first control specimen to dark blue are comparable; and

determining that the test specimen of unknown coating has a like coating to that of the second control specimen if the timing of the change in color of the entire test specimen to dark blue and the timing of the change in color of the entire second control specimen to dark blue are comparable.

38. The method of claim 37, further including steps of:

testing a control specimen that is a bare rivet; and

determining whether the test specimen of unknown coating is a bare rivet or not.

39. The method of claim 37, further including a step of:

comparing the timing of the change in color of the test specimen to the timing of the change in color of the first control specimen in order to estimate a relative thickness of a sol-gel coating on the test specimen.

40. A method of testing for the presence of a coating of sol-gel, alodine, or sol-gel over alodine on an aluminum aircraft part, the method comprising:

(A) immersing said aluminum aircraft part in a first solution of ammonium molybdate and etching solution;

(B) measuring a first time required for a visual change to occur; and

(C) comparing said first time to a second time required for a similar visual change to occur when an aluminum aircraft part having a known coating of sol-gel, alodine, or sol-gel over alodine is immersed in a second solution having the same composition as said first solution.

41. The method according to claim 40 wherein said visual change is a turning blue.

42. The method according to claim 40 wherein said visual change is a turning opaque.

43. The method according to claim 40 wherein all of said aluminum aircraft parts have the same shape and are made of the same alloy of aluminum.

44. The method according to claim 40 wherein said aluminum aircraft part is tested for the presence of a coating of sol-gel, alodine, and sol-gel over alodine and three aluminum aircraft parts are used in step (C), one coated with only sol-gel, one coated with only alodine, and one coated with sol-gel over alodine.

45. A test solution comprising:
ammonium molybdate solution; and
hydrochloric acid solution.

46. The test solution of claim 45 wherein:
said ammonium molybdate solution is mixed in proportion of 10 g of ammonium molybdate, 4-hydrate in 100 ml water.

47. The test solution of claim 45 wherein:
said hydrochloric acid solution is hydrochloric acid mixed in a one-to-one ratio with water.

48. The test solution of claim 45 wherein:
a ratio of said ammonium molybdate solution to said hydrochloric acid solution is 2:1 by volume.

49. The test solution of claim 45 wherein:
a ratio of said ammonium molybdate solution to said hydrochloric acid solution is between 1:1 and 4:1 by volume.

50. The test solution of claim 45 wherein:
a coated aluminum test specimen is immersed in said test solution.

51. The test solution of claim 45 wherein:
a sol-gel coated aluminum test specimen is immersed in said test solution.

52. An indicating/etching solution comprising:
ammonium molybdate solution; and
nitric acid.